

# A Comparison Of Femoral Nerve Block and Adductor Canal Block For Pain Management After Simultaneous Bilateral Total Knee Arthroplasty

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## Introduction

Although the efficacy of femoral nerve block (FNB) for pain after TKA has been reported, there is a risk of temporary weakness of quadriceps femoris muscle. Adductor canal block (ACB) has recently come under global spotlight as a procedure that does not cause weakness of quadriceps femoris muscle. The aim of this study is to compare the efficacy of FNB with ACB after simultaneous bilateral TKA.

## Methods

50 patients ( 100 operated knees ) were enrolled , who underwent simultaneous bilateral TKA in a single institution between February and December 2017.

### All cases

- Spinal anesthesia ( 0.5% bupivacaine )
- Peri-articular injection ( PAI ) : ( 15 ml of 0.75% ropivacaine, 15 ml of epinephrine-containing 0.5% lidocaine, 40 mg of triamcinolone acetonide )

### Groups

- Group F : FNB injection in the right knee
- Group A : ACB injection in the left knee

Injection under ultrasonic guidance immediately after TKA.

The drug used was 10 ml of 0.75% ropivacaine for each injection.

### Evaluation

- 5 hours postoperatively : Hip joint flexion, positive/negative straight leg raising (SLR), and buckling,
- 24 hours : SLR, right-left difference in pain, and presence/absence of deep vein thrombosis (DVT)
- 3 and 5 days, and 1, 2, and 3 weeks : Knee extension and flexion angle
- 1, 2, and 3 weeks : Quadriceps femoris muscle strength
- 3 weeks: Knee Society Score (KSS)

### Demographic data of the study groups

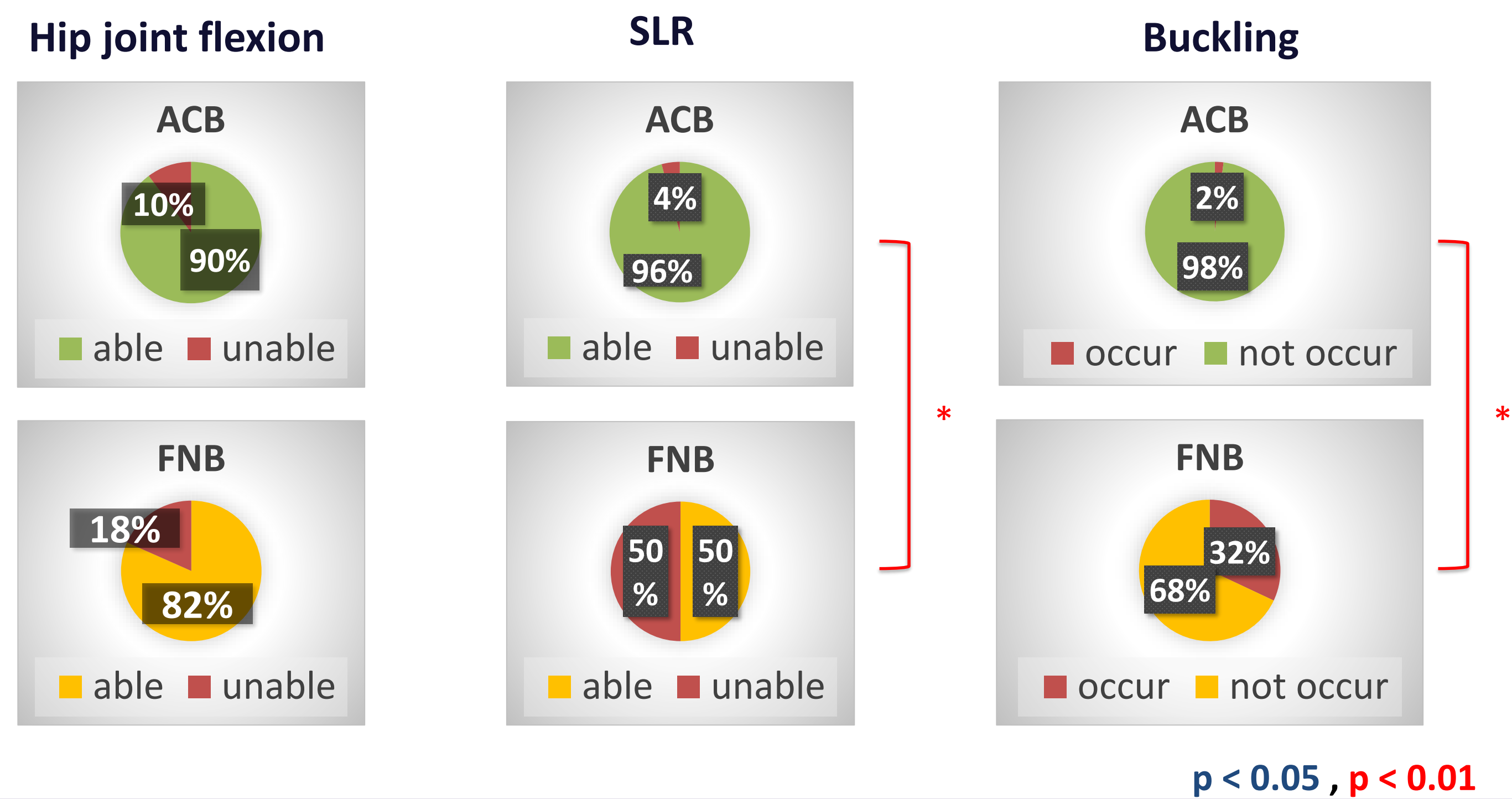
	Group F	Group A
Number of cases	50	50
Mean age (yrs)	75.8	
Gender		
Male	7	
Female	43	
Osteoarthritis	49	
Articular rheumatism	1	
BMI	26.5	

### Statistical analysis

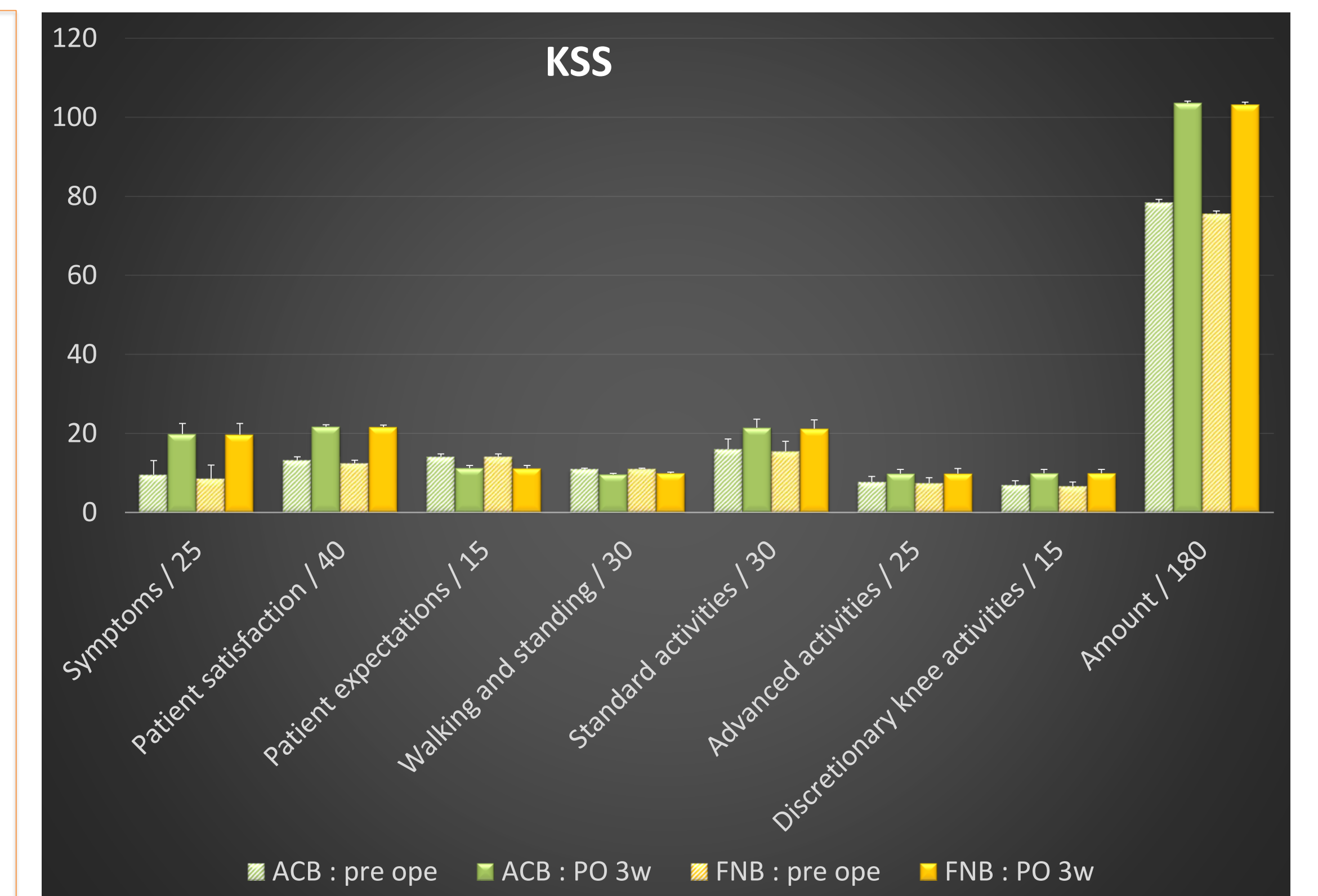
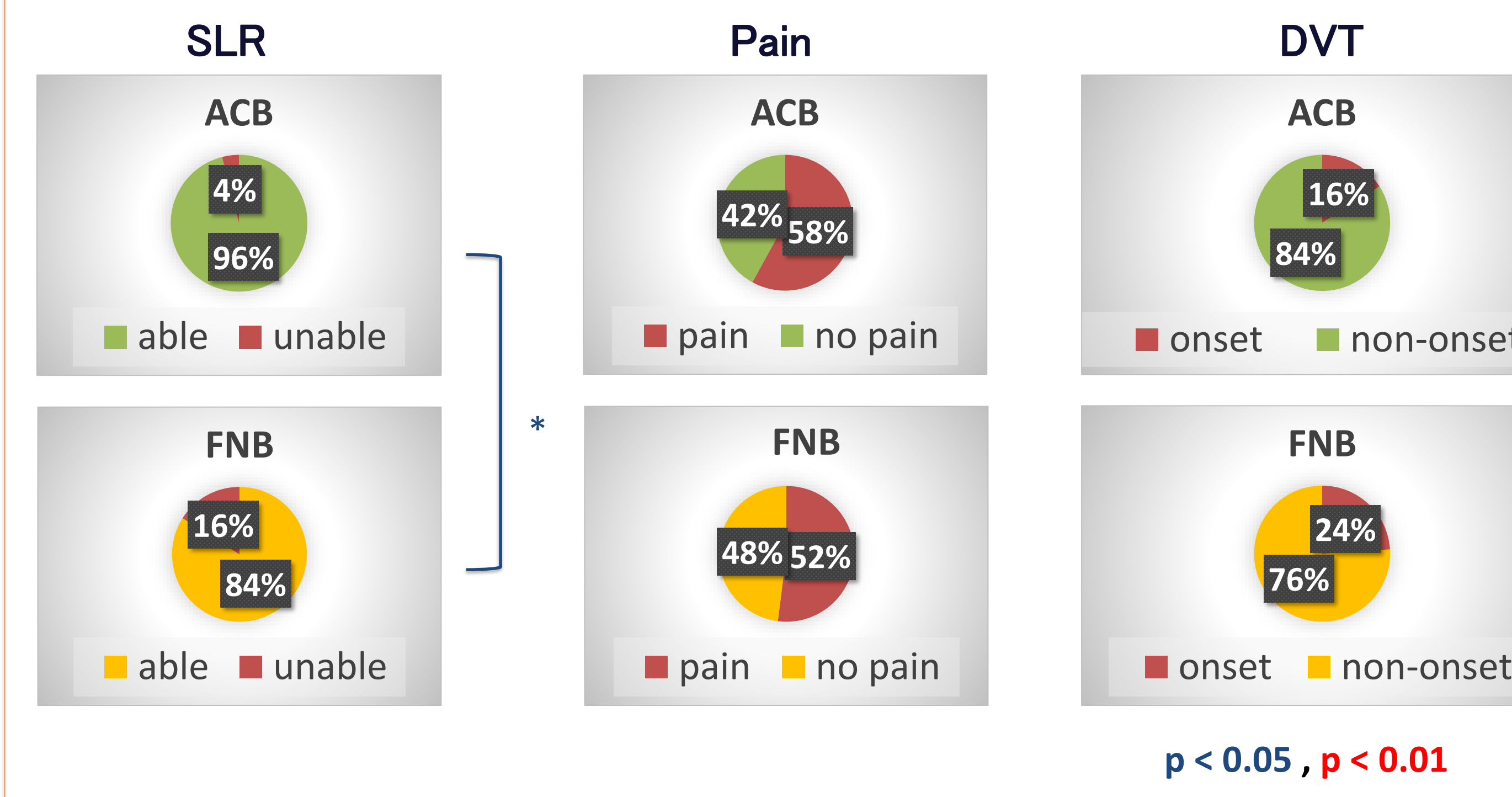
t test and chi-square test ( p < 0.05 )

## Results

### At 5 hours after surgery



### At 24 hours after surgery



Time points	extension ( ° )			flexion ( ° )			quadriceps femoris muscle strength ( kgf )		
	ACB	FNB	Significance	ACB	FNB	Significance	ACB	FNB	Significance
Preoperative	7.3 ( 6.9 )	7.6 ( 6.1 )	0.816	132 ( 14.4 )	132.4 ( 14.5 )	0.890	11.1 ( 5.92 )	10.7 ( 5.53 )	0.736
PO 3 d	2.2 ( 3.2 )	3.1 ( 3.8 )	0.202	109 ( 15.2 )	107.1 ( 15.3 )	0.535	NS	NS	
PO 5 d	2.1 ( 3.0 )	2.8 ( 3.7 )	0.301	115.5 ( 13.4 )	112.1 ( 14.5 )	0.226	NS	NS	
PO 1 w	1.5 ( 2.9 )	1.9 ( 2.8 )	0.487	120.3 ( 11.7 )	117.5 ( 9.49 )	0.193	8.6 ( 3.89 )	8.7 ( 3.89 )	0.904
PO 2 w	1.1 ( 2.5 )	1.3 ( 2.4 )	0.688	126.4 ( 8.81 )	123.7 ( 9.99 )	0.155	10.0 ( 4.21 )	10.1 ( 4.08 )	0.880
PO 3 w	1.0 ( 2.3 )	1.5 ( 2.5 )	0.399	129.9 ( 9.81 )	128.3 ( 9.86 )	0.438	11.2 ( 4.13 )	11.6 ( 4.02 )	0.639

PO, postoperative ; SD, standard deviation. Data are presented as means ( SD ).

## Discussion

References	Cases ( FNB / ACB )	Unilateral or Bilateral	Method	Pain	Quadriceps muscle strength
Koh et al. ( 2017 )	50 / 50	Bilateral ( same day )	10 ml 0.75% Ropivacaine	FNB = ACB ( pain score )	ACB > FNB ( ~at 48h ) FNB = ACB ( POD 7 )
Nabil et al. ( 2017 )	31 / 31	Unilateral	20 ml 0.5% Ropivacaine	FNB = ACB ( pain score , opioid use )	ACB > FNB ( at 24h )
Grevstad et al. ( 2015 )	25 / 25	Unilateral	30 ml 0.2% Ropivacaine	FNB = ACB ( at 2h )	ACB > FNB ( at 2h )
Kim et al. ( 2014 )	47 / 46	Unilateral	15 ml 0.5% Bupivacaine with 5 µg/ml epinephrine	FNB = ACB ( ~ POD 2 )	ACB > FNB ( at 6-8h ) FNB = ACB ( POD 1 )
Jaeger et al. ( 2013 )	26 / 22	Unilateral	30 ml 0.5% Ropivacaine then infusion of 0.2% ropivacaine	FNB = ACB ( pain score , opioid use )	ACB > FNB ( at 24h )

### Our study

ACB was equivalent to FNB in the pain-relieving effect and patient satisfaction. There was no substantial decrease in muscle strength immediately after surgery.

This study suggests that ACB serves as an effective pain control measure, allowing early ambulation and rehabilitation interventions after surgery.

## Significance

- The effects of FNB and ACB were compared after simultaneous bilateral TKA.
- ACB was equivalent to FNB in pain-relieving effect, knee extension, bending angle, and KSS.
- ACB was associated with significantly lower frequencies of negative SLR at 5 and 24 hours postoperatively, and buckling at 5 hours postoperatively than FNB.